

REPORT DOCUMENTATION PAGE

Public reporting burden for this collection of information is estimated to average 1 hour per response, including gathering of data needed, reviewing and collecting the collection of information, reviewing and completing the collection of information, and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Service, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and in the Office of Management and Budget, Paperwork Project (0182-0001), Washington, DC 20503-2941.

1. AGENCY USE ONLY (Leave blank) 2. REPORT DATE 12/24/96 3. REPORT TYPE AND DATES COVERED FINAL REPORT: SEPT. 1993-SEPT. 1996

4. TITLE AND SUBTITLE
UNITED STATES - JAPAN INDUSTRY AND
TECHNOLOGY MANAGEMENT TRAINING:
UNIVERSITY OF WISCONSIN PROGRAM

5. FUNDING NUMBERS

AFOSR (F49620)-
93-1-0615
(G)

6. AUTHOR(S)

JAMES L. DAVIS and
THOMAS W. CHAPMAN

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

COLL. OF ENG., UNI. OF WISCONSIN, MADISON; NATIONAL
TECH. UNIVERSITY; ROSE-HULMAN INST. OF TECH.;
ENG. ALLIANCE FOR GLOBAL EDUCATION (UNI. OF ILLINOIS);
AMERICAN SOCIETY FOR ENGINEERING EDUCATION

8. PERFORMING ORGANIZATION
REPORT NUMBER

144-DX59

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

AFOSR/NI
Building 410
Bolling AFB, DC 20332-6448

10. SPONSORING/MONITORING
AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

NO LIMITATION ON DISTRIBUTION

12b. DISTRIBUTION CODE

DISTRIBUTION STATEMENT A

Approved for public release
Distribution Unlimited

13. ABSTRACT (Maximum 200 words)

TO MEET THE OBJECTIVE OF THE JI/TM PROGRAM, THE UNIVERSITY OF WISCONSIN ORGANIZED A PROJECT WITH SEVERAL ELEMENTS. FIRST, TO PREPARE A SIGNIFICANT NUMBER OF ENGINEERING STUDENTS TO WORK WITH JAPAN, FUNDING WAS PROVIDED TO THE EAGLE CONSORTIUM OF THIRTEEN SCHOOLS TO SUPPORT TRAINING IN JAPANESE LANGUAGE AND CULTURE. SECOND, TO REACH MANAGERS IN GOVERNMENT LABORATORIES, A SERIES OF SEMINARS ABOUT JAPANESE TECHNOLOGY, INFORMATION, AND MANAGEMENT WAS DEVELOPED FOR THE NATIONAL TECHNOLOGICAL UNIVERSITY (NTU). FINALLY, TO SERVE BOTH STUDENTS AND PROFESSIONALS THE WISCONSIN TECHNICAL JAPANESE LANGUAGE PROGRAM WAS SUPPORTED. INSTRUCTION IN THIS PROGRAM IS AVAILABLE FROM WISCONSIN DIRECTLY AND THROUGH NTU.

BETWEEN 1991 AND 1996 THE EAGLE SUMMER PROGRAM PROVIDED TRAINING IN JAPAN FOR 219 ENGINEERING STUDENTS OF THESE MORE THAN 120 HAVE UNDERTAKEN LONG-TERM INTERNSHIPS IN JAPANESE INDUSTRY OR UNIVERSITIES. THE AMERICAN SOCIETY FOR ENGINEERING EDUCATION (ASEE) HAS TAKEN OVER ADMINISTRATION OF THE EAGLE PROGRAM TO DEVELOP A NATION-WIDE ENGINEERING INTERNSHIP PROGRAM OFFERING INDUSTRIAL EXPERIENCE IN JAPAN.

14. SUBJECT TERMS

JAPANESE LANGUAGE, MANAGEMENT OF TECHNOLOGY,
INTERNSHIPS

15. NUMBER OF PAGES

19

16. PRICE CODE

17. SECURITY CLASSIFICATION
OF REPORT

UNCLASSIFIED

18. SECURITY CLASSIFICATION
OF THIS PAGE

UNCLASSIFIED

19. SECURITY CLASSIFICATION
OF ABSTRACT

UNCLASSIFIED

20. LIMITATION OF ABSTRACT

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18
298-102

19970227 044

December 24, 1996

Thomas W. Chapman, Director

To: Dr. Koto White
AFOSR

From: Thomas W. Chapman
James L. Davis

Subject: Final Report on AFOSR Grant F49620-93-1-0615
United States-Japan Industry and Technology Management
Training Program



In order to meet the objectives of the United States-Japan Industry and Technology Management Training Program (JITMT), the University of Wisconsin-Madison (UW) formed a partnership with the National Technological University (NTU) and the Engineering Alliance for Global Education (EAGLE). Through their various resources the partners undertook the tasks identified in JITMT, first with a grant in 1991 and then with a subsequent grant in 1993. This report summarizes the activities under the latter grant. The partnership has been notably successful in providing experience in Japan to American engineers and managers and in disseminating information about Japanese technology and management methods.

Under this grant the UW Technical Japanese Program continued to offer technical-Japanese-language instruction to students in industry and government by distance-learning methods. A number of important teaching materials were developed under the program.

NTU, through its satellite-based network, delivered not only the UW technical-Japanese courses but also video conferences and seminars dealing with Japanese technology and management. Also, participants in the NTU Management of Technology MS degree were able to attend a residency in Japan where they visited a number of Japanese industrial and research operations.

The EAGLE program, a consortium of 15 major engineering schools, coordinated not only by UW but also by Rose Hulman Institute of Technology and the University of Illinois at Urbana Champaign, continued to provide the intensive EAGLE summer course in Japan for engineering students and new graduates. This excellent program prepares young engineers for industrial internships in Japan. Over the course of the two AFOSR grants 219 students attended the EAGLE summer program in Japan, and at least 120 of

DTIC QUALITY INSPECTED 3

the graduates have participated in long-term industrial internships or research placements in Japan.

The one area in which the program has not been an unqualified success is in obtaining independent financing. When the AFOSR grants were initiated, it was expected that the grantee institutions would provide significant cost sharing and ultimately make the programs self-sustaining. It was expected that the EAGLE program would obtain corporate funding from Japan and from the US, but corporate support to sustain the EAGLE summer program has been slow in coming. To facilitate this process and to make the EAGLE program a truly national program, EAGLE affiliated with the American Society for Engineering Education (ASEE), which is currently trying to establish a successor Engineering Internships in Japan Fellowship Program.

The accomplishments of each of the components of the UW JITMT program are described below.

UW Technical Japanese Program

The Wisconsin Technical Japanese Program activities include instruction in Technical Japanese language, teaching courses on business and technology in Japan, conducting research on technology development in Japan, and preparing instructional materials. Descriptions of activities for 1993-4 and 1994-5 from previous reports to AFOSR are attached.

During the 1995-96 academic year the University of Wisconsin broadcast a total of five semester-length, credit-bearing Japanese courses live via the NTU satellite network. Four of these courses were also delivered via audiographic teleconferencing. Two of these five courses were offered to professionals for the first time. During the Fall semester of 1996 two semester-length courses were broadcast. In addition, each semester several students and professionals carried out Japanese technical translation projects on an Independent Study basis

1) The "Basic Technical Japanese" sequence introduces professionals who have never studied Japanese before to enough grammar and kanji to enable them to read Japanese technical documents in their own field with the aid of a dictionary. Professionals participate in the same class with graduate and undergraduate engineering students at the UW-Madison. This sequence was taught by Professor Jim Davis of the Department of Engineering Professional Development. A summary of enrollments for this sequence follows:

Basic Technical Japanese I (Fall, 1995)		
Corporate	12 students	8 sites
DoD/DoE	3 students	2 sites
On Campus	4 students	1 site
Total	19 students	11 sites

Basic Technical Japanese II (Spring, 1996)

Corporate	11 students	7 sites
DoD/DoE	2 students	2 sites
On Campus	1 students	1 site
Total	14 students	10 sites

Basic Technical Japanese I (Fall, 1996)

Corporate	19 students	8 sites
DoD/DoE	0 students	0 sites
On Campus	5 students	1 site
Total	24 students	9 sites

Professionals from the following DoD/DoE sites participated in these courses:

Griffiss Air Force Base, Rome, NY
Naval Surface Warfare Center, Dahlgren, VA

2) The "Intermediate Technical Japanese" sequence, offered at a distance for the first time in Fall, 1995, helps professionals build an extensive vocabulary of scientific and engineering terms, review the grammar necessary to read technical documents, read essays adapted from Japanese scientific textbooks, and translate a document of their choice. Professionals participate in the same class with graduate and undergraduate engineering students at the UW-Madison. This sequence was taught by Professor Jim Davis of the Department of Engineering Professional Development. A summary of enrollments for this sequence follows:

Intermediate Technical Japanese I (Fall, 1995)

Corporate	6 students	3 sites
DoD/DoE	4 students	3 sites
On Campus	7 students	1 site
Total	17 students	7 sites

Intermediate Technical Japanese II (Spring, 1996)

Corporate	8 students	5 sites
DoD/DoE	3 students	3 sites
On Campus	8 students	1 site
Total	19 students	9 sites

Intermediate Technical Japanese I (Fall, 1996)

Corporate	12 students	6 sites
DoD/DoE	0 students	0 sites
On Campus	9 students	1 site
Total	21 students	7 sites

Professionals from the following DoD/DoE sites participated in this sequence:

Army Research Lab, Fort Monmouth, New Jersey
Griffiss Air Force Base, Rome, NY
Robins Air Force Base, GA

3) The "Japanese for Business and Industry" course provides an opportunity for professionals to learn patterns of business communication in Japan, important Japanese business practices, and the organization of Japanese industry. Professionals participate in the same class with graduate and undergraduate students at the UW-Madison. This course was taught by Ms. Junko Mori of the Department of Engineering Professional Development. A summary of enrollments for this course follows:

Japanese for Business and Industry (Fall, 1995)		
Corporate	1 student	1 site
DoD/DoE	3 students	2 sites
On Campus	6 students	1 site
Total	10 students	4 sites

Professionals from the following DoD/DoE sites participated:

Griffiss Air Force Base, Rome, NY
Robins Air Force Base, GA

4) Every semester several undergraduate students, graduate students, and professionals who have completed the Intermediate Technical Japanese sequence choose to participate in Independent Study under the direction of Prof. Jim Davis. These students translate from Japanese into English recent technical articles or chapters of technical books in their own fields. Since Fall 1995 a total of 11 students and professionals have completed or are now working on such projects. A list of students and translation topics follows:

UW-Madison undergraduate student	polymer composites
UW-Madison undergraduate student	polymer coatings
UW-Madison undergraduate student	media architecture
UW-Madison undergraduate student	disease detection in plants
UW-Madison graduate student	computer architecture
UW-Madison graduate student	flood plain formation in Japan
UW-Madison graduate student	economic deregulation in Japan
professional	wood chemistry
professional	drug biosynthesis
professional	quality engineering
professional	digital imaging

NTU Japanese Technology Programs

NTU served as a major vehicle for the delivery of Japanese language and Japanese management courses from Wisconsin as well as other Japan-related programs. In addition, NTU has increased the Japan content in its prestigious Management of Technology M.S. program and has completed a series of non-credit courses on Japanese management practices.

During the summer of 1995 NTU conducted a two-week study mission to Japan for 77 American engineers and managers in conjunction with the Management of Technology M.S. program. The FY93 JITMT grant provided incremental funding to carry out this study mission in place of the normal two-week residency at a site in the U.S. Among the participants in the study mission were 17 DoD or DoE professionals (including 14 from the Air Force) whose tuition for the two-year MOT program was fully or partially paid with JITMT grant funds. Of the 161 professionals who have entered the MOT program during the period of the FY91 and FY93 grants, 27 highly capable engineers and managers from DoD or DoE organizations (including 22 Air Force personnel) have been supported by JITMT grant funds.

The series of 21 Japan-related non-credit programs offered by NTU since 1991 as part of the Advanced Technology and Management Program attracted a total enrollment of 6,041 engineers, managers, and engineering students. Approximately 35% of these participants were DoD or DoE professionals, with 725 participants coming from the Air Force alone.

The EAGLE Japan Program

EAGLE is a consortium of American engineering schools that share the common goal of providing engineering students opportunities to learn Japanese language and to obtain professional experience in Japan. Engineering graduates with such ability and experience are needed in the US to facilitate technical cooperation with Japan and indeed to compete with Japan commercially.

The member schools of EAGLE represent a good geographical distribution across the US and produce a significant portion of engineering BS degrees in the nation. Several other JITMT grantees are also EAGLE members. The member institutions during the period of the grant have been

Cornell University
Lehigh University
Rose Hulman Institute of Technology
Temple University
University of California at Berkeley

Georgia Institute of Technology
North Carolina State University
State University of New York at Buffalo
Texas A&M University
University of Illinois at Urbana Champaign

University of Michigan
University of Texas - Austin
Vanderbilt University

University of New Mexico - Albuquerque
University of Wisconsin - Madison

The University of Washington has joined EAGLE more recently.

With AFOSR grant funds starting in the fall of 1991, EAGLE has organized nine-week intensive courses in Japan for engineering students and new graduates and offered them in each of the past five summers. These courses provide Japanese-language instruction by native speakers who teach at American universities during the academic year. The program also has a cultural component provided by cultural anthropologists, who explain both everyday life in Japan as well as the environment in corporate and research-lab situations so that the graduates know how to fit into such situations.

The EAGLE summer course requires that students have some prior language training on their home campuses. The classes have been kept relatively small, and the programs have been located at a number of sites to avoid overwhelming any one location. In recent years, the program has been run in Niihama and in Kanazawa. In both locations EAGLE received considerable support from the local community. Students had opportunities to interact with the local society; in a number of cases home stays were arranged.

EAGLE has also endeavored to arrange industrial internships in Japan for its participants by distributing resumes to Japanese companies and by arranging introductions while the students are in Japan. A formal agreement with Osaka Chamber of Commerce and Industry (OCCI) assisted this effort, and EAGLE participants were invited to OCCI job fairs.

Over the course of the program 219 students have attended the EAGLE summer programs. Generally, the evaluation of the program by the students has been outstanding. They reported improving their Japanese considerably and were encouraged to continue language study at their home institutions. Also, a number of the participants decided to seek long-term internships in Japan. Although our alumni data base is still not complete, we have identified a total of 116 EAGLE participants have gone back to Japan for internships. Most of these have been in Japanese industry, but a few have been in university research laboratories. We estimate a total of at least 2000 person-months in Japan, with 71 people spending at least 971 person months in Japan since September 1993. This is an impressive accomplishment, especially in light of the weak Japanese economy and high yen during this period.

The EAGLE internship participants are now making their ways back to the US. Based on our tentative alumni survey, alumni are involved in the following activities:

Working for a US employer	29
US graduate school	23
US military/government	4

Universities in Japan	19
Still on internships in Japan	27
US company in Japan	4
Japanese company in US	2
Japanese company elsewhere	2

Among the companies employing EAGLE alumni are General Motors, Xerox, General Electric, Litton Industries, Hughes Missile Systems, Microsoft, Johnson Controls, Motorola, Procter & Gamble, United Technologies, Delco, Ford, and Goodyear, as well as Anderson Consulting and Ernst & Young. These results refute those who claimed that the JITMT program was simply a program to train personnel for Japanese companies. Also, it is interesting that many of the participants have returned to seek post-graduate degrees. These people will play an important role in the future in balancing the flow of research information between the US and Japan.

EAGLE has not participated actively in the JETRO internship-placement activity. The major obstacle to using their help is that EAGLE "interns" fall into a different category from the other JITMT interns. The concept of EAGLE is that the industrial experience in Japan should occur on a relatively long-term, post-graduation level. The participants are thus professional engineers. Therefore, they expect to be paid a professional-level salary. Most of the JETRO internships have carried little or no salary support, and many did not even offer travel expenses to the participant. Nevertheless, the EAGLE experience has demonstrated that Japanese companies are willing to hire young American engineers and to pay them an appropriate professional salary.

The ASEE Engineering Internships Program

Although the EAGLE program has been quite successful in recruiting participants nationally, in providing a top-quality educational experience in Japan, in placing a number of graduates in industrial internships, and in establishing a good reputation in Japan, it has not meet its objective of becoming financially self-supporting with industrial grants. Although it has been demonstrated that both Japanese and American companies value the personnel developed by EAGLE, it has been difficult to create a mechanism to channel financial support to sustain the program. The major problem is that a loose affiliation of academics, with little formal organization and no ongoing budget, has no mechanism to solicit nor to receive industrial support efficiently.

To solve this problem, and to make the EAGLE program nationally accessible, Wisconsin and EAGLE have formed an affiliation with the American Society for Engineering Education (ASEE), the leading organization of its type in the US. During the past year of the AFOSR grant, ASEE had a subcontract to develop an ongoing Japan Internship Program. Essentially, the objective is to transfer the EAGLE program unto the auspices of ASEE. ASEE is creating a program under which Japanese companies will donate fellowship funds to support interns as well as to fund the EAGLE summer program. ASEE will serve as the administrative agency for EAGLE, maintaining the key

data bases and handling the fellowship funds. Furthermore, ASEE will assist interns upon their return to the US by informing American companies of their availability for permanent employment.

In May 1996 a delegation from ASEE traveled to Japan to meet with Japanese companies, with MITI, JETRO, and other Japanese organizations, and with the US Embassy and the American Chamber of Commerce to explain this program and to seek advice and support. Generally, the Japanese companies were receptive and provided helpful advice. The Japan Foundation indicated how a non-profit fund could be established by ASEE with them for handling the fellowship grants. The only negative response received during this trip was that MITI and JETRO indicated that they could not assist the effort if it were no longer supported by the US Government, as through JITMT.

In September 1996 ASEE organized a workshop in Washington for industry and government representatives to develop the program further. Subsequent to that workshop, ASEE has received a tentative commitment of partial funding of its near-term administrative costs from the US-Japan Friendship Commission. A related grant proposal has been prepared for submission to the National Science Foundation.

Cost-sharing Issues

In the 1993 proposal for this grant, a large degree of cost sharing was indicated. In the subsequent contract a total amount of \$2,214,213 in cost sharing was called for. Much of this cost sharing has been achieved by NTU through fee-paying participation in its Japan-related programs. Wisconsin has also met its cost-sharing obligations. On the other hand, there was a significant amount of cost sharing expected to come from industrial support for the EAGLE program.

Direct corporate support of EAGLE has not yet materialized. ASEE is still working to establish the mechanisms needed to attract such support. Nevertheless, numerous EAGLE participants have received support from Japanese companies and Japanese government scholarships to undertake long-term internships in Japan. Since September of 1993 we estimate that at least 71 EAGLE alumni have spent at least 971 person months in Japan with such support. With a very minimal estimate of \$1000/person-month as the real cost of living in Japan in an internship, disregarding other costs of transportation, etc., one can estimate that the total contribution to the program from Japanese sources has been at least \$971,000. It is proposed that this amount should be credited as cost sharing to the subject grant.

Conclusions

The JITMT program had a number of objectives, all of which have been met effectively by the Wisconsin-NTU-EAGLE consortium. We believe that the most important and far-reaching aspect of this program is its human-resource-development

dimension. Through production of new teaching materials, through dissemination of technical Japanese language, and through the training of many young engineers in Japan, this program has laid the groundwork for much more effective interactions with Japan in the future. Because of this program, the US is much better prepared to learn from Japan, to transfer technology effectively, to cooperate, and to compete.

Because of the clear success of the Wisconsin programs, it is regrettable that AFOSR sat fit to discontinue funding after 1996. The EAGLE program, in particular, has demonstrated its viability as an effective program to give a significant number of American engineers experience in dealing with Japan. It provides an umbrella program that supports the efforts of all of the JITMT grantees and of the JITMT program in general. It would be regrettable if EAGLE were allowed to die at this point.

It can be argued that corporations should support EAGLE, and so they should as primary beneficiaries of its results. On the other hand, like defense and basic education, preparation of the country to function effectively in the global economy is a legitimate function of government. We urge Congress and the Department of Defense to continue support for JITMT and to provide partial continued funding for the EAGLE program so that the opportunity for young American engineers to become Japan-proficient can be maintained.

University of Wisconsin-Madison Japanese Program

A) Wisconsin's Technical Japanese Program

During the 1993-94 academic year the University of Wisconsin broadcast a total of six semester-length, credit-bearing Japanese courses live via the NTU satellite network. Four of these courses were also delivered via audiographic teleconferencing. Three of these six courses were offered for the first time; development of these new courses was carried out as part of the AFOSR grant. During the Fall semester of 1994 four semester-length courses were broadcast. In addition to the three courses offered in Fall, 1993 one new course was inaugurated. This course was also created with funding from the AFOSR grant.

The "Basic Technical Japanese" sequence introduces professionals who have never studied Japanese before to enough grammar and kanji to enable them to read Japanese technical documents in their own field with the aid of a dictionary. Professionals participate in the same class with graduate and undergraduate engineering students at the University of Wisconsin-Madison. This sequence was taught by Professor Jim Davis of the Department of Engineering Professional Development at the University of Wisconsin-Madison. A summary of enrollments for this sequence follows:

Basic Technical Japanese I (Fall, 1993)

Corporate	22 students	8 sites
DoD/DoE	7 students	5 sites
On Campus	7 students	1 site
Total	36 students	14 sites

Basic Technical Japanese II (Spring, 1994)

Corporate	13 students	5 sites
DoD/DoE	5 students	3 sites
On Campus	5 students	1 site
Total	23 students	9 sites

Basic Technical Japanese I (Fall, 1994)

Corporate	17 students	9 sites
DoD/DoE	3 students	2 sites
On Campus	8 students	1 site
Total	31 students	12 sites

Dr. Koto White
December 26, 1994
Page 5

Twenty-one of these sites participated via the NTU satellite network; two sites participated via audiographic teleconferencing. Professionals from the following DoD/DoE sites participated in this sequence:

Fort Monmouth, New Jersey
Naval Surface Warfare Center, Bethesda, MD
Naval Surface Warfare Center, Dahlgren, VA
Robins Air Force Base, GA
Coastal systems Station, Panama City, FL
Naval Air Warfare Center, Indianapolis, IN

The "Advanced Technical Japanese" course, offered for the first time in Fall, 1993, provides an opportunity for professionals to read current technical articles from Japanese journals in important and rapidly changing technical fields. Professionals participate in the same class with graduate and undergraduate engineering students at the University of Wisconsin-Madison. This sequence was taught by Professor Jim Davis of the Department of Engineering Professional Development at the University of Wisconsin-Madison. A summary of enrollments for this sequence follows:

Advanced Technical Japanese (Fall, 1993)

Corporate	3 students	2 sites
DoD/DoE	5 students	2 sites
On Campus	3 students	1 sites
Total	11 students	5 sites

Advanced Technical Japanese (Fall, 1994)

Corporate	2 students	2 sites
DoD/DoE	4 students	2 sites
On Campus	4 students	1 sites
Total	10 students	5 sites

Five of these sites participated via the NTU satellite network; one site participated via audiographic teleconferencing. Professionals from the following DoD/DoE sites participated in this sequence:

Griffiss Air Force Base, Rome, NY
Robins Air Force Base, GA

The "Japanese for Business and Industry" course, offered for the first time in Spring, 1994, provides an opportunity for professionals to learn patterns of business communication in Japan, important Japanese business practices and the organization of Japanese industry. Professionals participate in the same class with graduate and undergraduate students at the University of Wisconsin-Madison. This sequence was taught by Professor Jim Davis of the Department of Engineering Professional Development at the University of Wisconsin-Madison. A summary of enrollments for this course follows:

Japanese for Business and Industry (Spring, 1994)

Corporate	3 students	2 sites
DoD/DoE	4 students	2 sites
On Campus	4 students	1 sites
Total	11 students	5 sites

Three of these sites participated via the NTU satellite network; one site participated via audio-graphic teleconferencing. Professionals from the following DoD/DoE sites participated:

Griffiss Air Force Base, Rome, NY
Robins Air Force Base, GA

The "Elementary Japanese" sequence provides an opportunity for professionals to develop basic skills in listening, speaking, reading and writing colloquial Japanese. These courses emphasize situations commonly encountered in Japan. Elementary Japanese II was offered for the first time in Spring, 1994. This sequence was taught during the 1993-94 academic year by Ms. Miki Yoroizuka, and during the 1994-95 academic year by Ms. Junko Mori. Both women held the position of Lecturer in the Department of Engineering Professional Development at the University of Wisconsin-Madison. A summary of enrollments for this sequence follows:

Elementary Japanese I (Fall, 1993)

Corporate	4 students	4 sites
DoD/DoE	2 students	2 sites
Total	6 students	6 sites

Elementary Japanese II (Spring, 1994)

Corporate	2 students	2 sites
DoD/DoE	8 students	3 sites
Total	10 students	5 sites

Elementary Japanese I (Fall, 1994)

Corporate	1 student	1 sites
DoD/DoE	2 students	2 sites
Total	3 students	3 sites

All of these sites participated via the NTU satellite network. Professionals from the following DoD/DoE sites participated in this sequence:

Griffiss Air Force Base, Rome, NY
Army Research Laboratory, Aberdeen, MD
Naval Surface Warfare Center, Dahlgren, VA
Robins Air Force Base, GA

The "Science and Technology in Japan" course was offered for the first time during the Fall, 1994 semester. This course provides an opportunity for professionals to learn about the development of Japanese scientific and technological capabilities from the mid-1800's until the end of World War II. Professionals participate in the same class with graduate and undergraduate students at the University of Wisconsin-Madison. This sequence was taught by Professor Jim Davis of the Department of Engineering Professional Development at the University of Wisconsin-Madison. A summary of enrollments for this course follows:

Science and Technology in Japan (Fall, 1994)

DoD/DoE	3 students	2 sites
On Campus	4 students	1 sites
Total	7 students	3 sites

Both off-campus sites participated via the NTU satellite network. Professionals from the following DoD/DoE sites participated in this sequence:

Robins Air Force Base, GA
Naval Air Warfare Center, Indianapolis, IN

B) Research in Japan

Professor James L. Davis of the University of Wisconsin-Madison received support to conduct research on conducting polymers in Tokyo, Japan during the summer of 1994. During this eleven-week period he worked in Functional Materials Section No. 1 of the Central Research Laboratory at Nippon Paper Industries, Ltd. He carried out experiments on the synthesis of conducting polymers and coated these polymers onto polyethylene sheets to produce conducting sheets. Such sheets could become part of lightweight, rechargeable batteries for use in portable electronic devices.

Researchers at Nippon Paper Industries have accumulated considerable experience in both organic synthesis and coating technology. The cooperation with researchers at Nippon Paper Industries did produce some advances. However, due to the short duration of the stay, no papers were published. Professor Davis is attempting to continue this research with funding from other sources.

An additional benefit of this stay was exposure to the methods used by researchers and managers in a Japanese corporation to select research topics and to manage an overall research program. During the Spring, 1995 semester Professor Davis will teach a new course entitled "Management of Technology in Japan." Some of the information gained by Professor Davis during his stay in Japan will be incorporated into this new course.

C) Publications

1. "Monitoring Japanese Scientific and Technical Information Using JICST (The Japan Information Center of Science and Technology)"; J. L. Davis, E. Livny. Database. 17(3) 33-42. 1994.
2. "Computer-Assisted Distance Learning, Part I: Audiographic Teleconferencing, Interactive Satellite Broadcasts, and Technical Japanese Instruction from the University of Wisconsin-Madison"; J. L. Davis, T. W. Smith. IEEE Transactions on Education. 37(2) 228-233. 1994.
3. "Retrieval of Japanese Scientific and Technical Information from the JICST Online Information System (JOIS)"; J. L. Davis, E. Livny. Journal of Chemical Information and Computer Sciences. 34(3) 485-490. 1994.

D) Conference Presentations

1. "Applications of Audiographics in Distance Education"; J. L. Davis. Presented to the Midwest Chapter of the International Teleconferencing Association; Madison, Wisconsin. 1993.
2. "The United States-Japan Industry and Technology Management Training Program at the University of Wisconsin-Madison"; J. L. Davis, T. W. Chapman, T. W. Smith. Presented at the 1993 Joint National Meeting of the Operations Research Society of America/The Institute of Management Sciences (ORSA/TIMS); Phoenix, Arizona. 1993.
3. "Technical Japanese Instruction for Scientists and Engineers"; J. L. Davis. Presented at the 46th Annual Meeting of the Association for Asian Studies (AAS); Boston, Massachusetts. 1994.
4. "Applications of Audiographic Teleconferencing in Language Education"; J. L. Davis, R. Burnson. Presented at the 1994 Conference of Wisconsin Teachers of English to Speakers of Other Languages (WITESOL); Madison, Wisconsin. 1994.
5. "Computer-Assisted Delivery of Technical Japanese Instruction at the University of Wisconsin-Madison"; J. L. Davis. Presented at the 1994 Pacific Conference of the International Council for Distance Education (ICDE); Wellington, New Zealand. 1994.
6. "Distance Education and the Technical Japanese Program at the University of Wisconsin-Madison"; J. L. Davis. Presented at the U.S.-Japan Seminar: The State of Teaching Japanese to Scientists and Engineers; Pittsburgh, Pennsylvania. 1994.
7. "Computer-Assisted Distance Education and Technical Japanese Instruction at the University of Wisconsin-Madison."; J. L. Davis. Presented at the Fourth Annual NTIS/JICST Conference: Locating and Acquiring Japanese Scientific and Technical Information; Boston, Massachusetts. 1994.
8. "Case Study in Distance Education: Teaching Technical Japanese via Audiographic Teleconferencing"; J. L. Davis. Presented at the University of Wisconsin Distance Education Symposium; Madison, Wisconsin. 1994.
9. "Technical Japanese Instruction at the University of Wisconsin-Madison"; J. L. Davis. Presented at the Teaching Technical Japanese Workshop; Seattle, Washington. 1994.

tuition for the two-year MOT program was fully or partially paid with JITMT grant funds. The list of participants in class #6 of the MOT program appears as Attachment 2. Of the 161 professionals who have entered the MOT program during the period of the FY91 and FY93 grants, 27 highly capable engineers and managers from DoD or DoE organizations (including 22 Air Force personnel) have been supported by JITMT grant funds.

The series of 21 Japan-related non-credit programs offered by NTU since 1991 as part of the Advanced Technology and Management Program attracted a total enrollment of 6,041 engineers, managers, and engineering students. Approximately 35% of these participants were DoD or DoE professionals, with 725 participants coming from the Air Force alone.

University of Wisconsin-Madison Japan Program

Wisconsin's interest and capability with regard to Japan and technical Japanese language tie this program together into a coherent entity. Wisconsin has been intimately involved in both the promotion of the EAGLE program and the NTU instructional programs. New credit-bearing courses have been developed and offered to students on the Madison campus as well as to professionals in industry and government. New teaching materials for technical Japanese have been published and are available for general use.

During the 1994-95 academic year the University of Wisconsin offered a total of nine semester-length, credit-bearing courses devoted to Japan. Seven of these courses were broadcast live via the NTU satellite network or audiographic teleconferencing. Two of these courses were offered for the first time; development of both courses was carried out with AFOSR grant support. The list of courses offered follows:

Fall, 1994

Elementary Japanese I	3 credits	
Basic Technical Japanese I	4 credits	
Intermediate Technical Japanese I	3 credits	
Advanced Technical Japanese	3 credits	
Science and Technology in Japan	3 credits	[New]

Spring, 1995

Basic Technical Japanese II	4 credits	
Intermediate Technical Japanese II	3 credits	
Japanese for Business and Industry	3 credits	
Management of Technology in Japan	3 credits	[New]

The total enrollment (including students on and off campus) for these nine courses reached 81 people, the largest number of participants over a two-semester period in the thirteen-year history of the Technical Japanese Program at Wisconsin.

In July, 1995 the University of Wisconsin Press and the University of Tokyo Press co-published a series of four Technical Japanese Supplements. *Basic Technical Japanese* (BTJ), the only textbook available to technical professionals who have no experience in Japanese but wish to learn to read Japanese technical documents, presents a general scientific vocabulary and provides the student with a solid grammatical foundation. The supplementary volumes complement BTJ by concentrating on kanji, vocabulary and expressions that are essential for reading technical documents in one specific field, or by providing in-depth explanations of the history and usage of kanji that are commonly used in technical documents. The titles and authors of these books follow:

Biotechnology

James L. Davis, Ph.D.

Associate Professor

Department of Engineering Professional Development

University of Wisconsin-Madison

Polymer Science

R. Byron Bird, Ph.D.

Professor Emeritus

Department of Chemical Engineering

University of Wisconsin-Madison

Solid-State Physics

Craig T. Van Degrift, Ph.D.

Kanji-Flash Softworks

Gaithersburg, Maryland

Kanji for Comprehending Technical Japanese

Edward E. Daub, Ph.D.

Professor Emeritus

Department of Engineering Professional Development

University of Wisconsin-Madison

One set of books was given to each JITMT grant recipient and to each of several key government organizations, including AFOSR. These books are available commercially for use in universities and language schools or for self-study.

Publications

1. "Translation Markets in the United States and Japan"; J. L. Davis. *The ATA Chronicle* 24(2):16. 1995.
2. "The Translation Market for Japanese and English in the United States and Japan"; J. L. Davis. Article reprinted in *The JAT Bulletin* (published by the Japan Association of Translators) 120:2-3. 1995.
3. "Japanese Organizations and Their English Translations"; book review published in *The JLD Times: Newsletter of the Japanese Language Division of the American Translators Association*; 4(4):10-12. 1995.
4. "Japanese Organizations and Their English Translations"; book review reprinted in *The JAT Bulletin* (published by the Japan Association of Translators) 128:8-9. 1995.
5. "Retrieval of Japanese Scientific and Technical Information from the JICST Online Information System (JOIS)"; J. L. Davis, E. Livny. Paper translated into Japanese and published in the Japanese journal *Joho Kanri* (Journal of Information Processing and Management); 38(6):513-522. 1995.

Conference Presentations

1. "Computer-Assisted Distance Education and Technical Japanese Instruction at the University of Wisconsin-Madison."; J. L. Davis. Presented at the Fourth Annual NTIS/JICST Conference: Locating and Acquiring Japanese Scientific and Technical Information; Boston, Massachusetts. 1994.
2. "Case Study in Distance Education: Teaching Technical Japanese via Audiographic Teleconferencing"; J. L. Davis. Presented at the University of Wisconsin Distance Education Symposium; Madison, Wisconsin. 1994.
3. "Technical Japanese Instruction at the University of Wisconsin-Madison"; J. L. Davis. Presented at the Teaching Technical Japanese Workshop; Seattle, Washington. 1994.
4. "The JICST Online Information System (JOIS) as a Tool for Translators"; J. L. Davis. Presented at the 35th Annual Conference of the American Translators Association (ATA); Austin, Texas. 1994.
5. "Directing Students toward Technical Careers in Japanese"; J. L. Davis. Presented at the 1994 Conference of the Wisconsin Association of Foreign

Language Teachers (WAFLT); Appleton, Wisconsin. 1994.

6. "Introduction to JICST and JICST Searching Strategies"; J. L. Davis. Presented at the MCC Workshop for JITMT Centers: Electronic Databases for the JITMT Program; Austin, Texas. 1995.
7. "Computer-Assisted Distance Education and Foreign Language Instruction"; J. L. Davis. Presented to the University of Wisconsin System Council on International Education; Madison, Wisconsin. 1995.
8. "Experience Teaching Technical Japanese using Audiographics: Some Thoughts"; J. L. Davis. Presented at the UW Centers Audiographics Conference; Wausau, Wisconsin. 1995.

Summary

The JITMT program coordinated by the University of Wisconsin-Madison continues to reach large numbers of engineering undergraduate and graduate students in American universities, engineers and managers in DoD and DoE organizations, and technical professionals in American corporations. The combination of educational opportunities and Japan-related experience, carried out both on a face-to-face basis and through the utilization of distance learning technology, represents a balanced package of learning activities that is achieving the goals set forth in the Congressional mandate that created the JITMT program.